Distr.
LIMITED

E/ECA/NRD/CART/139
17 August 1989

Original: ENGLISH

UNITED NATIONS

ECONOMIC AND SOCIAL COUNCIL

ECONOMIC COMMISSION FOR AFRICA

Seventh United Nations Regional Cartography
Conference for Africa

6 - 11 September 1989
Ouagadougou, (Burkina Faso)

LC/NAIR321

THE ROLE OF THE REGIONAL CENTRE FOR SERVICES IN SURVEYING, MAPPING AND REMOTE SENSING IN REMOTE SENSING TECHNOLOGY TRANSFER IN EASTERN AND SOUTHERN AFRICA

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A B S T R A C T

The role of the Regional Centre for Services in Surveying, Mapping and Remote Sensing (RCSSMRS) in remote sensing technology transfer has been increased and enhanced in the Eastern and Southern African subregion through the three programme areas, namely training, project execution and provision of remote sensing data user assistance services.

A significant contribution to the technology transfer programme has been provided through training in the form of short-term and extended courses as well as on-the-job training. To date, more than 1,000 participants have been trained at the Centre.

The three programme areas continue to be supported by an excellent black-and-white and colour photo laboratory complex for processing Landsat and SPOT images. The Centre has continued to increase its imagery acquisition providing an extensive range of imagery collection.

Analogue techniques of data analysis are being augmented by digital methods for the data obtained by Landsat,SPOT and Meteosat.

Examples of projects completed using satellite remote sensing data have been cited and discussions on bottlenecks and problems of remote sensing technology transfer examined in light of the Centre's experience.

I. INTRODUCTION

1. The Regional Centre for Services in Surveying, Mapping and Remote Sensing (RCSSMRS), Nairobi, Kenya, has been able to play its role in remote sensing technology transfer since the establishment of the remote sensing facility in 1977. It has been able to do so largely through its comprehensive training programme, significant contribution in project execution and provision of remote sensing data user assistance services. RCSSMRS realizes that there are fundamental difficulties and adjustments inherent in remote sensing technology transfer which need to be addressed in order to achieve the desired results in Eastern and Southern African subregion.

2. The goals and objectives of remote sensing technology transfer continue to be complex due to the dynamic nature of the technology in developed countries. They are well placed to forge further ahead, given the technological advancement in developing new remote sensing techniques whose target is the developing countries. This phenomenon renders the developing countries to be on the receiving end of remote sensing technology.

3. Developing countries require up-to-date and accurate information on their natural resource base on which to base sound and rational decisions. Each

country has got priorities ranging from emergency needs to long-term commitments of resources assessment such as resource inventory and information systems. Resources base information in developing countries is lacking due to several reasons. The most common reasons are lack of trained personnel, equipment or funds to generate the information and inaccessibility of some regions because of poor communications. The resource base in these countries undergoes fast changes such as high rates of deforestation, rapid soil and environmental degradation from changes in land use due to disproportionate increase of population pressure. Remote sensing technology has proved to be one of the techniques that developing countries could use in the development of their data base information systems.

4. Due to the importance of remote sensing, a number of technology transfer programmes by aid-giving agencies have been initiated. These have been both at bilateral and multilateral as well as national and regional levels. The strategies for remote sensing technology transfer have evolved during the past 15 years and have included training of third world scientists in institutions of developed countries, project or equipment, grants for remote sensing demonstration projects in these countries and support for the establishment of national as well as regional remote sensing centres (Conitz, 1977 and Wagner, 1980). The United States Agency for International Development (USAID) has had a number of technology transfer programmes that have included remote sensing centres. RCSSMRS has well-established remote sensing activities at the initiative of USAID (Conitz 1981). This paper discusses the efforts of the Centre in remote sensing technology transfer and points out the bottlenecks that make it difficult for rapid achievement of desired results.

II. TRAINING

5. Training remains the most important means of remote sensing technology transfer that the Centre has used in Eastern and Southern African subregion. To date, more than 1,000 participants have been trained in various disciplines.

6. RCSSMRS runs three types of courses which include three-week short courses, extended courses as well as on-the-job training. The courses are discipline-specific as well as practically oriented to the professional needs of the participants (Odenyo, 1984). Recently, the Centre has been able to accept internship from various institutions in Kenya. The interest and results have been encouraging.

7. The short courses consist of one week of introduction to remote sensing, several field trips to correlate imagery and surface conditions, one week of discipline-specific applications and participant preparation of a proposal for a remote sensing project. The participants are provided with imagery of areas of interest. To date, the Centre has developed a series of training aids, field trips and classroom exercises courses.

8. Extended courses have proved popular since their introduction in 1982. The objectives of the extended courses are to provide greater exposure of participants to remote sensing and link the Centre to ongoing resource development projects in the subregion. These courses begin with two to three

weeks of classroom sessions in Nairobi. During this period, the participants define a project using remote sensing techniques to be conducted over several months in their home institutions. This project should be part of their normal employment activity. During the implementation of these projects, the Centre provides imagery, consultations in the field and other assistance as necessary and reasonable. The participants return to Nairobi for a one-week reporting period.

9. There is an increasing number of requests for intership training from some institutions in Kenya. Participants are normally final year students who require practical knowledge in remote sensing. Within three to four months, the participants complete a study in remote sensing guided by remote sensing staff. The participants are able to use the facilities at the Centre and are assisted in some ways with imagery and ground truthing.

III. USER SERVICES

10. RCSSMRS provides a range of services in assisting users of remote sensing techniques in the subregion. The most frequent activity is the processing of imagery orders and responding to main and personal inquiries on data availability, costs of obtaining imagery or possible application of remote sensing to specific problems.

11. A number of annotated brochures have been printed to provide information on the Centre and its activities. These materials have been prepared to meet the popular demand by the participants.

12. RCSSMRS receives group tours from institutions in Kenya as well as other countries. The frequency of such tours point to the increasing awareness of remote sensing technology.

IV. PROJECTS

13. RCSSMRS continues to be involved in a wide range of projects in the subregion. The projects are in response to requests from users. The requests have their origin in the training courses, information seminars and information brochures disseminated around the subregion by various means. More bilateral projects have been negotiated and implemented.

14. In most cases, the project activities are generally initiated by the recipient organization and the Centre provides imagery and consultation and may assist in obtaining of outside consultants when appropriate. The projects have been designed in such a way that the actual analysis is done by the staff of the initiating organization after being trained by RCSSMRS in remote sensing techniques. The Centre continues to coach and supervise them during the project implementation. This approach assures the initiating organization of two results, namely a usable product and staff members trained to apply remote sensing techniques in a particular problem area.

15. By 1984, the following projects were completed or about to be completed:

(a) A vegetation cover map of the United Republic of Tanzania using Landsat imagery at scale of 1:2 million and consisting of 12 level II classes and several sub-classes;

(b) A reconaissance soils map and an agricultural capability map were prepared by the soil survey unit of the Ministry of Agriculture, Government of Zambia for the North Western Province of Zambia;

(c) A survey of the forests in Kenya and an evaluation of rates of forest depletion. The study mapped 270 individual forests with a total forest cover of 1,167,180 ha or plantations and mangrove (Ochanda, 1982);

(d) A forest resources inventory for the Sudan using the Centre's Landsat imagery and equipment was completed in 1983;

(e) The Centre has been involved in many cartographic projects at various scales. Most of them are experimental seeking the approval of member countries.

16. Additional projects since 1984 include the following:

(a) SERISS project which attempted to forecast agricultural yields in the provinces of Darfur and Kordofan in the Sudan was completed in May 1988 and a final report presented to the Government of the Sudan;

(b) A Lesotho image map was recently completed and dispatched by the Overseas Ordinance Survey;

(c) A Dar-es-Salaam vegetation cover map is ready for printing. The map has been compiled at scale of 1;250,000 from Landsat data held at the Centre;

(d) A resources and environment project was completed for Uganda in 1988. The project was jointly executed by UNEP and the Regional Centre (UNEP, 1988).

V. DISCUSSIONS

17. Remote sensing technology transfer has been accepted to be the status quo between developed and developing countries. There is a constant flow of sophisticated equipment being developed with a view of finding market in developed countries. Since these equipment and techniques are developed far away from the areas where they a to be applied, there is always a gap of the real problems to be addressed.

18. Developing countries have no choice but to be on the receiving end in this game of technological development. Developed countries have ample financial resources which make it easy for them to be leaders in remote sensing

development. Many natural resources scientists in the Eastern and Southern African subregion feel that the high cost and lack of funds for acquisition of data and equipment have greatly contributed to the slow pace of remote sensing technology transfer.

19. Remote sensing technology is rapidly gaining popularity in a number of developing countries. Many countries have established national remote sensing centres through which the technology can be transferred. These centres have yet to be given adequate budgetary resources in order to have a realistic impact in the activities they undertake.

20. RCSSMRS considers institutional building to be a fundamental step in achieving the goals and objectives of remote sensing technology transfer. It is through these institutions that a large number of natural resources scientists will be exposed to remote sensing. The more the trained manpower, the faster the adoption of remote sensing technology.

21. Human population is rapidly increasing in many developing countries faster than the provision of adequate resources for their upkeep. It is with this in mind that rapid, accurate and cheap methods of resource data base information acquisition should be encouraged. Remote sensing technology is being developed to meet these requirements.

22. Associated with population increase is the provision of adequate educational facilities to cater for various technological advancements. The Centre has encouraged both university and college participants to take the study of remote sensing seriously. To date, three of the universities in Kenya have started remote sensing units in their course. One polytechnic college in Nairobi regularly requires its students in the environmental studies section to go through remote sensing internship at the Centre. We believe that in addition to adequate funds large numbers of scientists in remote sensing will bring about the success of remote sensing technology transfer.

V. REFERENCES

1. Conitz, M.W. and Donald, S.L. (1977), Remote Sensing Utilization by Developing Countries: An Appropriate Technology, Proceedings of the Eleventh International Symposium on Remote Sensing of Environment, pp. 1055-1064.

2. Ochanda, N. and Epp. H. (1982), Monitoring Recent Changes in Extent of Natural Forests in Kenya Using Remote Sensing Techniques. Proceedings, Symposium VII, International Society for Photogrammetry and Remote Sensing, Toulouse, pp. 489-495.

3. Odenyo, V. (1984), The Regional Remote Sensing Facility for Eastern and Southern AFrica, Eighteenth International Symposium on Remote Sensing Environment, Paris, France, pp. 215-227.

4. UNEP (1988), Resources and Environment in Uganda: Strategies for Environmental Management, UNEP.

5. Wagner, T.W. (1980), Mechanisms for the Transfer of Remote Sensing Technology to Developing Countries; Proceedings of the Fourteenth International Symposium of
Remote Sensing of Environment, pp. 1309-1310.